



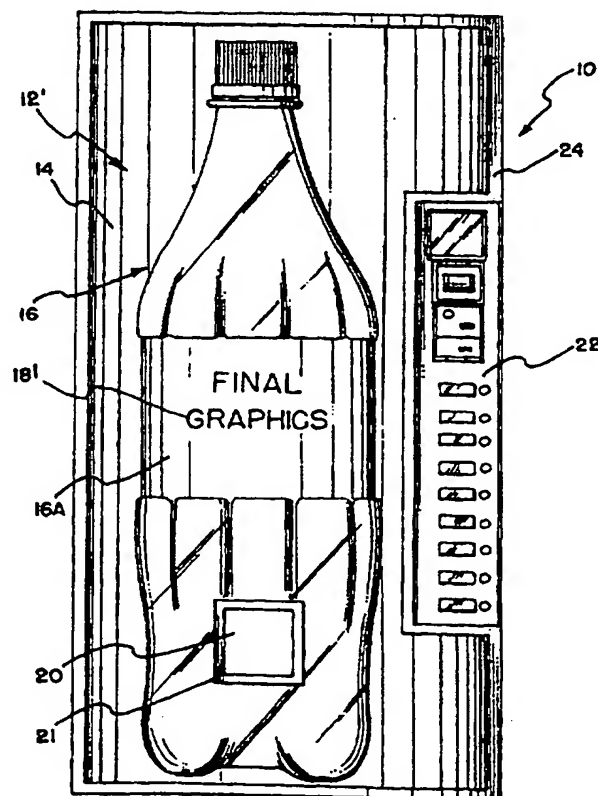
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US97/02656 (22) International Filing Date: 21 February 1997 (21.02.97) (30) Priority Data: 08/606,534                      23 February 1996 (23.02.96)      US (71) Applicant: THE COCA-COLA COMPANY [US/US]; 310 North Avenue, Atlanta, GA 30313 (US). (72) Inventors: ANTAO, Leonard, F.; 2013 Perrin Drive, Lawrenceville, GA 30243 (US). MINH, Tran, Q.; 5 Hidden Lakes Court, Stockbridge, GA 30281 (US). THOMPSON, George, L.; 2502 Meadowglen Trail, Snellville, GA 30278 (US). PURCELL, Robert; Allied Plastics, 4540 North Royal Atlanta Drive, Tucker, GA 30084 (US). VERNON, Timothy, C.; American Graphic Systems, 18650 Graphic Court, Tinley Park, IL 60477 (US). VERNON, Steven, A.; American Graphic Systems, 7700 Graphic Drive, Tinley Park, IL 60477 (US). (74) Agents: BIRCH, Anthony, L. et al.; Birch, Stewart, Kolasch & Birch, L.L.P., P.O. Box 747, Falls Church, VA 22040-0747 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  Published <i>With international search report.</i>	

(54) Title: VENDING MACHINE SIGN PANEL AND METHOD OF MAKING

## (57) Abstract

A vending machine for packaged beverages includes a housing defining a storage compartment for the packaged beverages to be discharged through a port in the face of the vending machine, a sign panel disposed across the face of the vending machine including a translucent backlighted panel, and a convex three-dimensional portion of a container secured to an outside surface of the translucent panel, the three-dimensional portion including high resolution graphics which evolve from distorted graphics on a flat sheet of material which was transformed into the three-dimensional portion. A method for distorting the graphics which appear on the final three-dimensional shape includes the step of developing distortion pattern data from an undistorted grid on a plastic sheet which is formed on a mold into the same convex three-dimensional shape of the sign panel to appear on the front of the vending machine. The resulting distortion in the grid is analyzed to generate the distortion pattern data, and this distortion pattern data is utilized to provide distorted graphics to a flat plastic sheet which is formed into the final convex three-dimensional shape of the sign panel on the face of the vending machine.



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**VENDING MACHINE SIGN PANEL AND  
METHOD OF MAKING**

**BACKGROUND OF THE INVENTION**

The present invention relates to a vending machine sign panel for packaged beverages including a shaped translucent panel which simulates the appearance of a bottle related to the packaged beverages within the vendor. More specifically, the present invention relates to a method of making the sign panel with creative shapes and product logos which highlights the unique package attributes of beverages which are merchandized by the vendor.

It is desirable to include three-dimensional (3-D) shapes on the front sign panels of vending machines such as a bottle associated with a product to be vended. It is also desirable to provide the bottle with high quality graphics such as product logo to be displayed by the backlighted sign panel.

Preferably the sign panel is fabricated from a durable plastic sheet, and the three-dimensional bottle is thermoformed by vacuum molding techniques in the sheet. In order to provide the bottle with graphics it is easiest to apply the graphics to the flat sheet before thermoforming the bottle. However, the graphics become distorted when transformed from a flat to a curved 3-D shape resulting in poor quality graphics on the 3-D bottle.

Accordingly, a need in the art exists for a

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method of distorting the graphics on the flat plastic sheet so that the final 3-D bottle displays high quality graphics for viewing by prospective customers.

#### SUMMARY OF THE INVENTION

5           Accordingly, it is a primary object of the present invention to provide a method for making an improved sign panel for a vendor which enables designers to add complex three-dimensional shapes such as packages, containers, products or objects with high  
10           quality graphics adding visual interest and consumer impact to the front of the vendor.

          It is another object of the present invention to provide a sign panel construction which allows designers to create unique side profiles for the  
15           vendor in order to communicate and emphasize package imagery in both the front and side views of the vendor.

          It is yet another object of the present invention to provide a sign panel construction for a vendor  
20           which may be retrofit to existing flat or curved door vendors in the field to add unique shapes and product identity to these units.

          The objects of the present invention are fulfilled by providing;

25           a method of making a sign panel with three-dimensional regions of predetermined shapes and graphics thereon for use on the face of a vending machine comprising the steps of:

30           providing a substantially flat sheet of material for forming the panel;

          selecting the final dimensions and shapes of the graphics to be located in the three-dimensional regions of the panel;

          comparing the final dimensions and shapes of the

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graphics with dimensional distortions of the flat sheet incurred by forming said three-dimensional regions into the predetermined shapes in order to determine distortion pattern data;

5       applying initial graphics to the flat sheet, said initial graphics being distorted in accordance with the distortion pattern data such that when the three-dimensional regions are formed the initial graphics are converted into the final graphics; and

10       forming said flat sheet into said sign panel including said three-dimensional regions with said predetermined shapes with said final graphics thereon.

      The three-dimensional shape in a preferred embodiment of the present invention is a bottle  
15       associated with products within the vending machine. The three-dimensional bottle has graphics in a selected region thereof which are backlighted through the sign panel from appropriate lighting within the vending machine. The decorative panel is preferably  
20       thermoformed with vacuum molding techniques from clear acrylic, polycarbonate or other plastic materials. Preferably the plastic chosen is tough and durable to provide security to the vending machine and to be essentially vandal resistant.

25       Further scope applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of  
30       the invention are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

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**BRIEF DESCRIPTION OF THE DRAWINGS**

The objects of the present invention and attendant advantages thereof will become more readily apparent by reference to the drawings wherein:

5        Fig. 1 is a front elevational view of a vending machine illustrating a sign panel on the front face thereof with a three-dimensional shape such as a bottle formed in the sign panel;

10       Fig. 2 is a plan view of a flat plastic sheet including the outline of the bottle to be formed in the three-dimensional bottle on the sign panel of Fig. 1 by vacuum/thermoforming techniques; and

15       Fig. 3 is a block diagram illustrating the method steps utilized for applying graphics to the flat plastic sheet of Fig. 2 which are then molded into the three-dimensional bottle shape of Fig. 1 in order to achieve high quality final graphics on the three-dimensional bottle.

**DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS**

20       Fig. 1 illustrates in front elevation the face of a vending machine 10 including a convex plastic sign panel 12' including a substantially continuous curved border region 14 surrounding a three-dimensional bottle-shaped region simulating a bottle 16. Bottle  
25       16 is actually a bottle portion which projects about 4 to 6 inches outwardly from surrounding surfaces 14 of sign panel 12. The bottle 16 includes a central label portion 16A on which a portion of final graphics 18' are formed in accordance with the method of the  
30       present invention. The vending machine 10 of Fig. 1 also includes a discharge port 20 through the sign panel 12' in a bottom region of the bottle 16 and a conventional control panel 22 recessed behind a cut-out 21 in the sign panel. Panel 12' fits into a frame

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24 about its periphery and discharge port 20 is surrounded by a frame 21.

5 The sign panel 12' on the vending machine face of Fig. 1 is formed from a flat sheet of plastic 12 illustrated in Fig. 2. While in its flat state the outline of the bottle 16 is defined by printed areas including bottom portion 16C, top portion 16B and cap portion 19. Distorted graphics 18 are provided in the central label region of the bottle 16A.

10 The graphics 18 are distorted because when the sheet 12 of Fig. 2 is vacuum/thermoformed into the curved and three-dimensional shape of the sign panel 12' of Fig. 1 the previously flat graphics are changed into the final graphics 18' and would be distorted in the final graphics if not distorted in order to  
15 compensate for the distortion which occurs in the transformation from a flat to the three-dimensional shape.

20 Preferably the entire flat panel 12 of Fig. 2 is printed prior to molding with all appropriate colors and graphics. For example, portions 16B, 16C of the bottle are printed a brownish color to simulate a cola beverage, and cap portion 19 is printed white. The border regions 14 are also printed with appropriate  
25 background colors or graphics such as graphics depicting a bed of crushed ice for supporting the bottle. The type of ink or paint selected must be able to withstand the temperatures and stretching which occur in the vacuum/thermoform molding process.  
30 Cut-out 21 for control panel 22 may be trimmed before or after molding.

The process of the present invention including steps for determining how to distort the graphics 18 for application to the flat plastic sheet of Fig. 2 is  
35 illustrated in Fig. 3.

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In step I a three-dimensional shape and associated graphics of the sign panel for use on the vending machine 10 in Fig. 1 is selected.

5 In step II a mold is fabricated from which the three-dimensional sign panel 12' of Fig. 1 will be vacuum/thermoformed;

10 The distortion that is needed in the distorted graphics 18 of Fig. 2 is then determined by steps III to V of Fig. 3. In step III undistorted grid sheets with equally spaced intersecting lines are printed on sheets of plastic of similar materials and dimensions to the plastic sheet 12 to be thermoformed. In step IV these undistorted grid sheets are vacuum/thermoformed in the mold fabricated in step II.

15 In step 5 the resulting distortion in the thermoformed grid sheets which are formed in the mold are analyzed to determine distortion pattern data. This distortion pattern data may be obtained by optically scanning the distorted grids. The data is  
20 stored in a computer and compared with an undistorted reference grid in order to quantify the distortion data according to regions of the mold.

The computer can then determine the specifics of the distorted graphics 18 to be applied to the label  
25 portion of the bottle on the flat sheet 12 of Fig. 2. These distorted graphics are prepared and then applied to the sheet 12 of Fig. 2 as illustrated in step VI of the flowchart of Fig. 3. The flat sheet 12 of Fig. 2 is finally placed in the mold and the final panel 12' of Fig. 2 is vacuum/thermoformed to achieve the proper  
30 shape of the bottle 16 and the final graphics 18' as illustrated in Fig 1. The final graphics 18' are thus of high quality since they were distorted while the panel 12 was flat, and end up as high quality  
35 undistorted images in the final graphics 18' which



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appear on the sign panel of the vending machine of Fig. 1.

Many of the above-described sequence of steps in Fig. 3 can be repeated on a trial and error basis to improve the quality of the final graphics as needed. However, with the use of a computer and optical scanning devices, which analyze the distortion of the molded grid sheets the distortion pattern of the graphics applied to the flat plastic sheet can be accurately determined and correlated to the final graphics in order to achieve a high quality product.

Although it is preferred to use an optical scanner and computer to analyze distortions in the molded grid sheets, the analysis could be done by manually measuring the displacement of the grid lines in the molded grid as compared to the positions of the grid lines on the flat sheet. The displacement could then be used to distort corresponding areas of the initial graphics on a trial and error basis until final graphics of suitable quality are achieved.

The bottle 16 is depicted in Fig. 1 is a registered trademark of The Coca-Cola Company. Other bottles or 3-D shapes may be used without departing from the spirit and scope of the present invention.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

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What is claimed is:

- 1     1.    A method of making a sign panel with three-  
2           dimensional regions of predetermined shapes and  
3           graphics thereon for use on the face of a vending  
4           machine comprising the steps of:  
5                 providing a substantially flat sheet of material  
6           for forming the panel;  
7                 selecting the final dimensions and shapes of the  
8           graphics to be located in the three-dimensional  
9           regions of the panel;  
10                comparing the final dimensions and shapes of the  
11           graphics with dimensional distortions of the flat  
12           sheet incurred by forming said three-dimensional  
13           regions into the predetermined shapes in order to  
14           determine distortion pattern data;  
15                applying initial graphics to the flat sheet, said  
16           initial graphics being distorted in accordance with  
17           the distortion pattern data such that when the three-  
18           dimensional regions are formed the initial graphics  
19           are converted into the final graphics; and  
20                forming said flat sheet into said sign panel  
21           including said three-dimensional regions with said  
22           predetermined shapes with said final graphics thereon.
- 1     2.    The method of claim 1 wherein the forming step  
2           includes thermoforming.
- 1     3.    The method of claim 2 wherein said predetermined

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2 shape is a container associated with products within  
3 the vending machine.

1 4. The method of claim 3 wherein the container is a  
2 bottle.

1 5. The method of claim 1 wherein said predetermined  
2 shape is a container associated with products within  
3 the vending machine.

1 6. The method of claim 5 wherein the container is a  
2 bottle.

1 7. The method of claim 1 wherein the step of  
2 comparing includes the substeps of:  
3 providing a flat sheet of material with an  
4 undistorted grid of intersecting lines thereon;  
5 forming the flat sheets and grid thereon into the  
6 proposed predetermined shape of the panel thereby  
7 distorting the grid; and  
8 analyzing the distortion of the grid to determine  
9 the distortion pattern data.

1 8. A sign panel made from the method of any one of  
2 claims 1 to 7.

1 9. A vending machine comprising:  
2 a housing defining a storage compartment therein  
3 for supporting packages to be vended through a  
4 discharge port;  
5 a sign panel disposed across the face of the  
6 vending machine including a translucent panel; and  
7 a convex three-dimensional portion of a container  
8 secured to an outside surface of the translucent  
9 panel, said three-dimensional portion including high

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10 resolution graphics which evolved from distorted  
11 graphics on a flat sheet of material which was  
12 transformed into the three-dimensional portion.

1 10. The vending machine of claim 8 wherein the  
2 container is thermoformed from a flat plastic sheet.

1 11. The vending machine of claim 8 wherein the sign  
2 panel is bowed and extends outwardly from the cabinet  
3 housing.

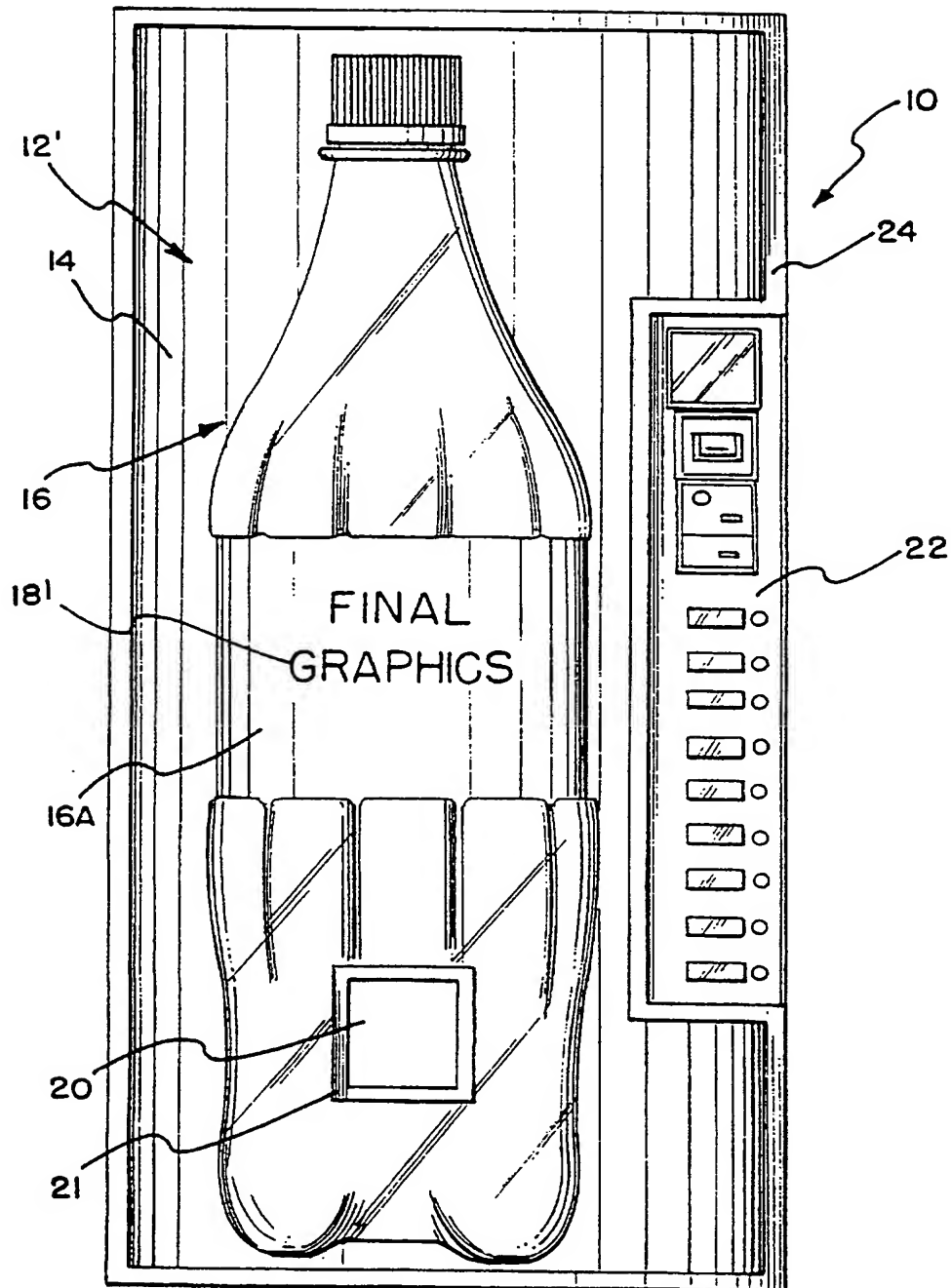


FIG. 1

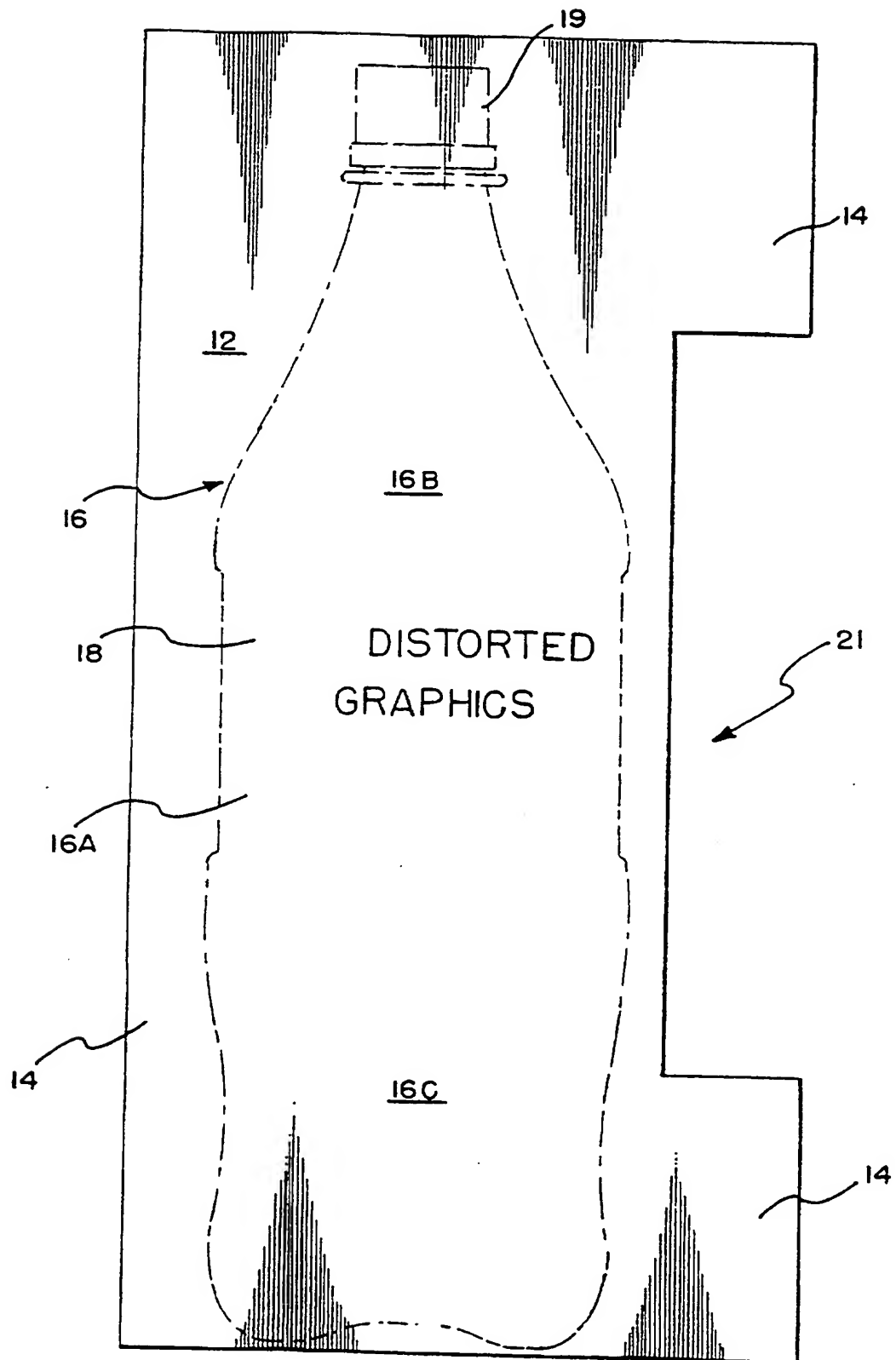


FIG. 2

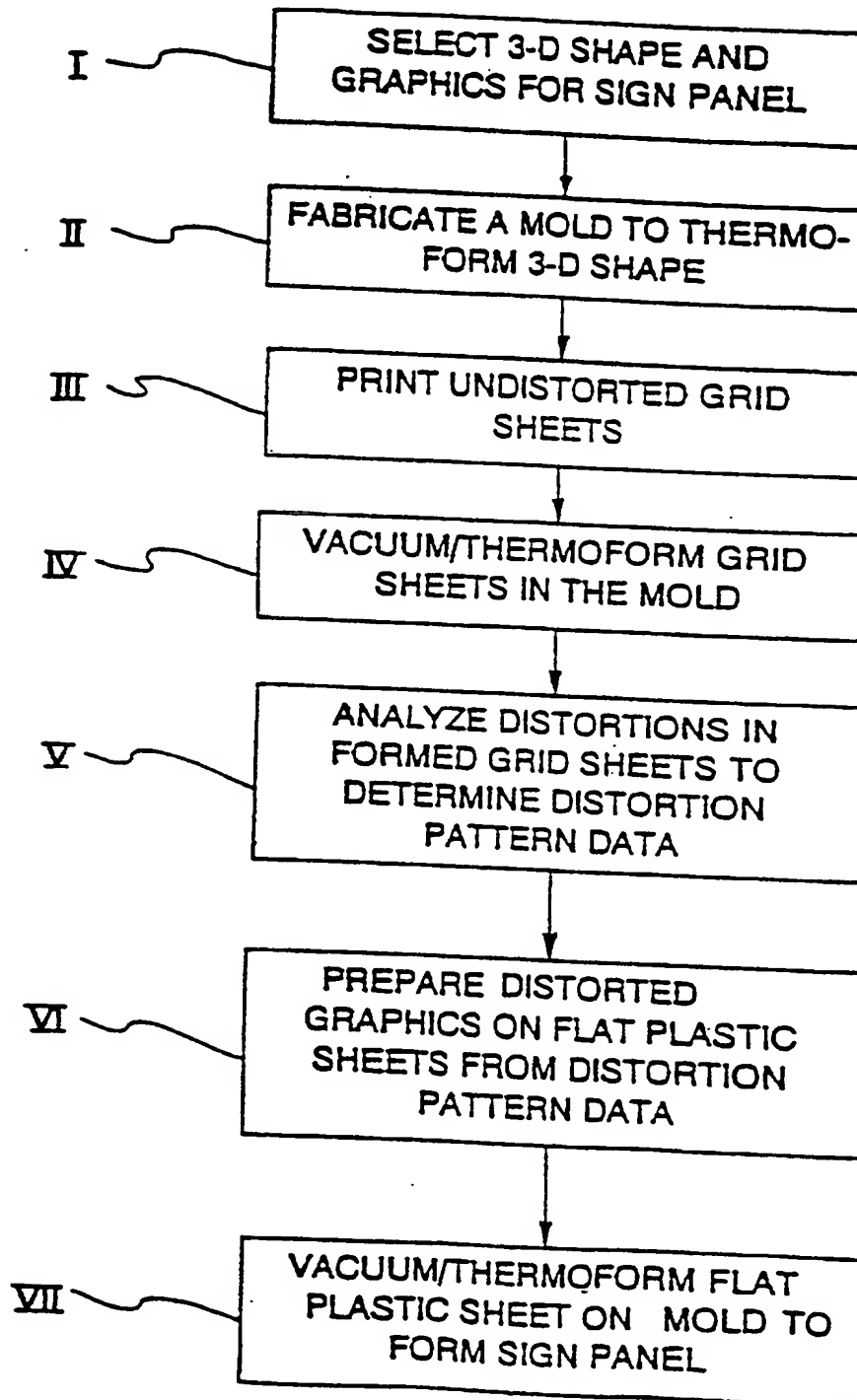


FIG.3

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 97/02656

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 G09F23/06 G07F9/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 G09F G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 345 705 A (LAWRENCE) 13 September 1994 see column 2, line 37 - column 3, line 35 see column 4, line 49 - line 68; figure 6 ---	1-6,8
A	WO 96 04639 A (THE COCA-COLA CO.) 15 February 1996 see page 5, line 12 - line 31; figure 1 ---	9,11
A	GB 2 192 180 A (THE COCA-COLA CO.) 6 January 1988 see page 2, line 22 - line 74; figures 1,2 ---	9,11
A	US 4 414 768 A (BACHMANN ET AL.) 15 November 1983 see column 3, line 20 - column 5, line 6; figures 1,2 ---	9
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

14 May 1997

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30.05.97

Name and mailing address of the ISA

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# INTERNATIONAL SEARCH REPORT

International Application No.  
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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 5 015 312 A (KINZIE) 14 May 1991  see column 5, line 14 - column 8, line 46;  figures 1-4</p> <p>-----</p>	1,8

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/02656

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